

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA9 | Central Chilterns

Data appendix (LQ-001-009)

Land quality

November 2013

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Department
for Transport

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1 Introduction

1.1.1 This land quality appendix for the Central Chilterns community forum area (CFA9) comprises :

- a summary of engagement undertaken (Section 2);
- detailed risk assessment (Section 3);
- inspection notes and other site data (Section 4);
- geological sites of special scientific interest (SSSI) and local geological sites (LGS) (Section 5); and
- mining and minerals data (Section 6).

1.1.2 Maps referred to throughout the land quality appendix are contained in Maps LQ-01-017 to LQ-01-018 Volume 5, Land Quality Map Book.

2 Engagement

2.1.1 Table 1 sets out the local authorities and other organisations that have been engaged with during the preparation of the land quality section of the environmental impact assessment (EIA) for this study area, the types of information that have been provided to the assessment team and any specific concerns of those with whom the team engaged.

Table 1: Engagement on land quality issues undertaken for the Central Chilterns study area

Local authority or other organisation	Method/dates of contact	Information provided and/or specific concerns
Buckinghamshire County Council	Contact via email on: 28 November 2012; 3 December 2012; 21 December 2012; 2 January 2013; 23 January 2013; 1 February 2013; 9 February 2013; and 2 May 2013.	Initial email regarding detailed mineral areas for assessing sterilisation of resources and requesting landfill data to provide more detail on what has already been received to assess contamination potential. Buckinghamshire County Council responded with the data requested regarding minerals and waste sites, as well as links to minerals safeguarding area (MSA) on the Buckinghamshire County Council website. Buckinghamshire County Council also supplied geographical information system (GIS) data showing MSA, preferred areas and landfill data and confirmed it does not have a designated petroleum officer or hold any information on underground storage tanks (UST).
Chiltern District Council (ChDC)	Contact via email on: 28 November 2012, 24 January 2013, 4 February 2013, 29 February 2013 and 10 May 2013. Contact via telephone on: 2 May 2013.	ChDC supplied requested information regarding sites that have potential land contamination, including GIS data and Part IIA ¹ sites and are in the vicinity of the Proposed Scheme; information regarding UST on Hyde Heath Road was also provided.
Environment Agency	Contact via email on: 24 April 2013; 15 May 2013; 24 May 2013; 12 June 2013; 14 June 2013; 27 June 2013; and 8 July 2013.	The Environment Agency has been contacted to supply information on landfills within the study area - data outstanding at the time of production of this report.

¹ Environmental Protection Act 1990, Part IIA, London, Her Majesty's Stationary Office.

3 Detailed risk assessment

3.1.1 This section presents assessments for areas potentially posing a contaminative risk for the Proposed Scheme within the study area. For each site the following data are presented:

- baseline risk assessment;
- construction risk assessment;
- post-construction risk assessment; and
- assessment of temporary (construction) and permanent (post-construction) effects.

3.1.2 This risk assessment incorporates the following assumptions:

- construction workers are not included as part of this assessment;
- sites that have been assessed as potentially posing a contaminative risk to the Proposed Scheme have been grouped and considered together where appropriate. It should be noted that some parcels of land may have had several land uses from different epochs;
- during construction standard mitigation procedures will be in place in accordance with the draft Code of Construction Practice (CoCP) (Volume 5: Appendix CT-003-000); and
- during the post-construction condition it is assumed that all required remediation has been undertaken and validated.

3.1.3 The sites assessed in this study area are shown on Maps LQ-01-017 to LQ-01-018 (Volume 5, Land Quality Map Book).

Table 2: Sites included in the detailed risk assessment within the Central Chilterns study area

Area reference	Area name	Table numbers
9-3	Former sand and gravel quarries	3, 9, 15, 21
9-4	Former sand and gravel quarries	4, 10, 16, 22
9-5	Infilled water feature	5, 11, 17, 23
9-6 and 9-7	Infilled water feature	6, 12, 18, 24
9-8	Potential tanks	7, 13, 19, 25
9-17	Former chalk pit	8, 14, 20, 26

3.1.4 Contaminant types included within the risk assessments are based on the Priority Contaminants Report CLR 8². Although withdrawn, this document is still commonly used and is considered good practice.

² Defra and Environment Agency, (2002), *Potential contaminants for the assessment of land- R&D Publication*, Bristol, Environment Agency.

3.1.5 The remainder of this section presents the risk assessment for the sites set out in Table 2. The following acronyms are used in these tables:

- LWS - local wildlife site;
- CSM - conceptual site model; and
- VOC - volatile organic compounds.

3.1 Baseline risk assessment

Table 3: Baseline CSM and qualitative risk assessment for former sand and gravel quarries (Area Ref 9-3)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Former sand and gravel quarries Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Unlikely	Severe	Moderate/low
	Ecological Hedgemoor and Farthings Woods LWS	Lateral migration of contaminated groundwater/leachate and surface run-off	Unlikely	Minor	Very low
		Contact with windblown dusts	Low likelihood	Minor	Low

Table 4: Baseline CSM and qualitative risk assessment for former sand and gravel quarries (Area Ref 9-4)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Former sand and gravel quarries Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Unlikely	Severe	Moderate/low
	Ecological Hedgemoor and Farthings Woods LWS	Lateral migration of contaminated groundwater/leachate and surface run-off	Unlikely	Minor	Very low
		Contact with windblown dusts	Unlikely	Negligible	Very low

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Table 5: Baseline CSM and qualitative risk assessment for infilled water feature (Area Ref 9-5)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled water feature Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use Housing (farm) within 50m Workers (farm) within 50m	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Unlikely	Moderate	Low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Property Building structures (farm) within 50m	Lateral migration and concentration of asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Negligible	Very low

Table 6: Baseline CSM and qualitative risk assessment for infilled water features (Area Refs 9-6 and 9-7)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled water features Assuming the sites have been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use	Inhalation/ingestion of or dermal contact with contaminated soils/dust	Low likelihood	Moderate	Moderate/low
	Housing (public house) partly overlying Area Ref 9-6, adjacent to Area ref 9-7				
	Workers (public house)	Inhalation of vapours derived from contaminated groundwater/soil	Unlikely	Moderate	Low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Property Building structures (public house)	Concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Negligible	Very low

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Table 7: Baseline CSM and qualitative risk assessment for potential tanks located near to garage (Area Ref 9-8)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Currently a vehicle repair garage. Historical description of 'garage' does not rule out petrol filling station. Tanks present on historical maps</p> <p>Contaminants could include fuels and oils, degreasants, heavy metals, asbestos. Degradation of organic compounds could generate ground gases (largely methane, carbon dioxide and VOC)</p>	Sensitive land use Garage employees	Inhalation/ingestion of or dermal contact with contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Likely	Moderate	Moderate
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Sensitive land use Housing (public house) Housing adjacent and within 50m	Inhalation/ingestion of or dermal contact with contaminated soils/dust	Unlikely	Moderate	Low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Property Building structures on-site	Concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Likely	Minor	Moderate/low
	Property Building structures adjacent and within 50m	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Minor	Low

Table 8: Baseline CSM and qualitative risk assessment for former chalk pit (Area Ref 9-17)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Former chalk pit</p> <p>Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk aquifer at surface</p>	Vertical and lateral migration of contaminated groundwater/leachate	Unlikely	Severe	Moderate/low

3.2 Construction risk assessment

Table 9: Construction CSM and qualitative risk assessment for former sand and gravel quarries (Area Ref 9-3)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Former sand and gravel quarries Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Severe	Moderate
	Ecological Hedgemoor and Farthings Woods LWS	Lateral migration of contaminated groundwater/leachate and surface run-off	Low likelihood	Minor	Low
		Contact with windblown dusts	Likely	Minor	Moderate/low

Table 10: Construction CSM and qualitative risk assessment for former sand and gravel quarries (Area Ref 9-4)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Former sand and gravel quarries Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Severe	Moderate
	Ecological Hedgemoor and Farthings Woods LWS	Lateral migration of contaminated groundwater/leachate and surface run-off	Low likelihood	Minor	Low
		Contact with windblown dusts	Unlikely	Negligible	Very low

Table 11: Construction CSM and qualitative risk assessment for infilled water feature (Area Ref 9-5)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Infilled water feature Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use Housing (farm) within 50m Workers (farm) within 50m	None (housing (farm) within 50m scheduled for demolition)	No contaminant linkage	No contaminant linkage	None
	Property Building structures (farm within 50m)	None (housing (farm) within 50m scheduled for demolition)	No contaminant linkage	No contaminant linkage	None

Table 12: Construction CSM and qualitative risk assessment for infilled water features (Area Refs 9-6 and 9-7)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Infilled water features Assuming the sites have been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use Housing (public house) partly overlying Area Ref 9-6, adjacent to Area Ref 9-7	None (public house scheduled for demolition)	No contaminant linkage	No contaminant linkage	None
	Workers (public house)	None (public house scheduled for demolition)	No contaminant linkage	No contaminant linkage	None

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Table 13: Construction CSM and qualitative risk assessment for potential tanks located near to garage (Area Ref 9-8)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Currently a vehicle repair garage. Historical description of 'garage' does not rule out petrol filling station. Tanks present on historical maps</p> <p>Contaminants could include fuels and oils, degreasants, heavy metals, asbestos. Degradation of organic compounds could generate ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Sensitive land use</p> <p>Garage employees</p>	Inhalation/ingestion of or dermal contact with contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Likely	Moderate	Moderate
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	<p>Sensitive land use</p> <p>Housing (public house)</p> <p>Housing adjacent and within 50m</p>	Inhalation/ingestion of or dermal contact with contaminated soils/dust	Unlikely	Moderate	Low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	<p>Property</p> <p>Building structures on-site</p>	Concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated	Likely	Minor	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
		groundwater/soil			
	Property Building structures adjacent and within 50m	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Minor	Low

Table 14: Construction CSM and qualitative risk assessment for former chalk pit (Area Ref 9-17)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Former chalk pit Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Severe	Moderate

3.3 Post-construction risk assessment

Table 15: Post Construction CSM and qualitative risk assessment for former sand and gravel quarries (Area Ref 9-3)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Former sand and gravel quarries Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Unlikely	Negligible	Very low
	Ecological Hedgemoor and Farthings Woods LWS	Lateral migration of contaminated groundwater/leachate and surface run-off	No contaminant linkage	No contaminant linkage	None
		Contact with windblown dusts	No contaminant linkage	No contaminant linkage	None

Table 16: Post Construction CSM and qualitative risk assessment for former sand and gravel quarries (Area Ref 9-4)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Former sand and gravel quarries Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Unlikely	Severe	Moderate/low
	Ecological Hedgemoor and Farthings Woods LWS	Lateral migration of contaminated groundwater/leachate and surface run-off	Unlikely	Minor	Very low
		Contact with windblown dusts	Unlikely	Negligible	Very low

Table 17: Post Construction CSM and qualitative risk assessment for infilled water feature (Area Ref 9-5)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Infilled water feature Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use Housing (farm) within 50m Workers (farm) within 50m	None (housing (farm) within 50m scheduled for demolition)	No contaminant linkage	No contaminant linkage	None
	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater	Unlikely	Negligible	Very low
	Property Building structures (farm within 50m)	None (housing (farm) within 50m scheduled for demolition)	No contaminant linkage	No contaminant linkage	None

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Table 18: Post Construction CSM and qualitative risk assessment for infilled water features (Area Refs 9-6 and 9-7)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Infilled water features Assuming the sites have been infilled with waste, contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use Housing (public house) partly overlying Area Ref9-6, adjacent to Area Ref 9-7 Workers (public house)	None (public house scheduled for demolition)	No contaminant linkage	No contaminant linkage	None
		None (public house scheduled for demolition)	No contaminant linkage	No contaminant linkage	None

Table 19: Post Construction CSM and qualitative risk assessment for potential tanks located near to garage (Area Ref 9-8)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Currently a vehicle repair garage. Historical description of 'garage' does not rule out petrol filling station. Tanks present on historical maps Contaminants could include fuels and oils, degreasants, heavy metals, asbestos. Degradation of organic compounds could generate ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use Garage employees	Inhalation/ingestion of or dermal contact with contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Likely	Moderate	Moderate
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Sensitive land use Housing (public house) Housing adjacent and within 50m	Inhalation/ingestion of or dermal contact with contaminated soils/dust	Unlikely	Moderate	Low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
	Property Building structures on-site	Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Likely	Minor	Moderate/low
	Property Building structures adjacent and within 50m	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Minor	Low

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Table 20: Post Construction CSM and qualitative risk assessment for former chalk pit (Area Ref 9-17)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Former chalk pit</p> <p>Assuming the site has been infilled with waste contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk aquifer at surface</p>	<p>Vertical and lateral migration of contaminated groundwater/leachate</p>	<p>Unlikely</p>	<p>Severe</p>	<p>Moderate/low</p>

3.4 Assessment of temporary (construction) and permanent (post-construction) effects

Table 21: Assessment of effects during construction and post construction for former sand and gravel quarries (Area Ref 9-3)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Vertical and lateral migration of contaminated groundwater/leachate into the Principal Chalk aquifer at surface	Moderate/low	Moderate	Very low	Minor adverse effect	Moderate beneficial effect
Lateral migration of contaminated groundwater/leachate and surface run-off into Hedgemoor and Farthings Wood LWS	Very low	Low	None	Minor adverse effect	Minor beneficial effect
Contact with windblown dusts in Hedgemoor and Farthings Wood LWS	Low	Moderate/low	None	Minor adverse effect	Moderate beneficial effect
Overall significance				Minor adverse effect	Minor beneficial effect

Table 22: Assessment of effects during construction and post construction for former sand and gravel quarries (Area Ref 9-4)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Vertical and lateral migration of contaminated groundwater/leachate into the Principal Chalk aquifer at surface	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Negligible
Lateral migration of contaminated groundwater/leachate and surface run-off into Hedgemoor and Farthings Wood LWS	Very low	Low	Very low	Minor adverse effect	Negligible
Contact with windblown dusts in Hedgemoor and Farthings Wood LWS	Very low	Very low	Very low	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Overall significance.				Minor adverse effect	Negligible

Table 23: Assessment of effects during construction and post construction for infilled water feature (Area Ref 9-5)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Inhalation/ingestion/dermal contact of contaminated soils/dusts by residents and workers (farm) within 50m	Moderate/low	None	None	Moderate beneficial effect	Moderate beneficial effect
Inhalation of vapours derived from contaminated groundwater/soil by off-site residents and workers (farm) within 50m	Low	None	None	Moderate beneficial effect	Moderate beneficial effect
Exposure to asphyxiative or explosive gases by and workers (farm) within 50m	Moderate/low	None	None	Moderate beneficial effect	Moderate beneficial effect
Vertical and lateral migration of contaminated groundwater/leachate into the Principal Chalk aquifer at surface	Moderate/low	Moderate	Very Low	Minor adverse effect	Moderate beneficial effect
Lateral migration and build-up of asphyxiative or explosive gases in building structures (within 50m)	Moderate/low	None	None	Moderate beneficial effect	Moderate beneficial effect
Direct contact of below ground building structures and services on-site and adjacent with contaminated groundwater/soil	Very low	None	None	Minor beneficial effect	Minor beneficial effect
Overall significance				Minor adverse effect	Minor beneficial effect

Table 24: Assessment of effects during construction and post construction for infilled water features (Area Refs 9-6 and 9-7)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Inhalation/ingestion/dermal contact of contaminated soils/dusts by on-site residents and workers (public house)	Moderate/low	None	None	Moderate beneficial effect	Moderate beneficial effect
Inhalation of vapours derived from contaminated groundwater/soil by on-site residents and workers (public house)	Low	None	None	Moderate beneficial effect	Moderate beneficial effect
Exposure to asphyxiative or explosive gases by on-site residents and workers (public house)	Moderate	None	None	Moderate beneficial effect	Moderate beneficial effect
Build-up of asphyxiative or explosive gases in on-site building structures (public house)	Moderate	None	None	Moderate beneficial effect	Moderate beneficial effect
Direct contact of below ground building structures and services on-site and adjacent with contaminated groundwater/soil	Very low	None	None	Minor beneficial effect	Minor beneficial effect
Overall significance				Minor beneficial effect	Minor beneficial effect

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Table 25: Assessment of effects during construction and post construction for potential tanks located near to garage (Area Ref 9-8)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Inhalation/ingestion/dermal contact of contaminated soils/dusts by on-site garage employees	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by on-site garage employees	Moderate	Moderate	Moderate	Negligible	Negligible
Exposure to asphyxiative or explosive gases by on-site garage employees	Moderate	Moderate	Moderate	Negligible	Negligible
Inhalation/ingestion/dermal contact of contaminated soils/dusts by on-site and adjacent residents	Low	Low	Low	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by on-site and adjacent residents	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure to asphyxiative or explosive gases by on-site and adjacent residents	Moderate	Moderate	Moderate	Negligible	Negligible
Build-up of asphyxiative or explosive gases in on-site building structures	Moderate	Moderate	Moderate	Negligible	Negligible
Direct contact of below ground building structures and services on-site with contaminated groundwater/soil	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Build-up of asphyxiative or explosive gases in adjacent building structures	Moderate	Moderate	Moderate	Negligible	Negligible
Direct contact of adjacent below ground building structures and services with contaminated groundwater/soil	Low	Low	Low	Negligible	Negligible
Overall significance				Negligible	Negligible

Table 26: Assessment of effects during construction and post construction for former chalk pit (Area Refs 9-17)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Vertical and lateral migration of contaminated groundwater/leachate into the Principal Chalk aquifer at surface	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Negligible
Overall significance				Minor adverse effect	Negligible

4 Inspections notes and other site data

- 4.1.1 There were no site visits carried out due to access constraints and no additional site data have been identified.

5 Geological sites of special scientific interest and local geological sites

5.1.1 There are no geo-conservation resources identified within the study area.

6 Mining and minerals data

- 6.1.1 There are no areas in this area that are currently being worked or that have planning permission. In addition this area of the route will not cross a preferred mineral site, a mineral safeguarding area or a mineral consultation area.
- 6.1.2 Hyde Farm Gravel Pit, 130m north-east of the route, Hyde Farm Chalk Pit, 30m south-west of the route in the central area, and Leather Lane chalk pit, immediately west of the route at the northern end have all been identified as areas of historical extraction of minerals.

7 References

Defra and Environment Agency, (2002), *Potential contaminants for the assessment of land - R&D Publication*, Bristol, Environment Agency.

Environmental Protection Act 1990, Part IIA, London, Her Majesty's Stationary Office.